

The Species of the Indo-West Pacific Genus *Calumia* (Pisces: Eleotridae)

H. K. LARSON and D. F. HOESE

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A brief diagnosis of the marine fish genus *Calumia* is given. *Eleotris godeffroyi* Günther is placed in *Calumia* as a senior synonym of the type species *C. biocellata* Smith. *Calumia profunda* is described as a new species from the Solomon Islands and the New Hebrides. The species of *Calumia* are among the smallest-sized eleotrids known, and *Calumia* is one of the few eleotrid genera found on coral reefs.

It is suggested that the genus *Allomicrodesmus* be transferred to the family Eleotridae.

H. K. Larson and D. F. Hoese, Department of Ichthyology, The Australian Museum, P.O. Box A285, Sydney South, Australia 2000; manuscript received 15 June 1978, accepted in revised form 21 February 1979.

INTRODUCTION

The family Eleotridae contains about forty genera of which only four, *Allomicrodesmus*, *Xenisthmus*, *Calumia* and an undescribed genus related to *Xenisthmus*, are confined to coral reefs of the Indo-west Pacific. The remaining genera are inhabitants of fresh or brackish water. *Allomicrodesmus* has been included in the family Microdesmidae (Schultz 1966), but it is apparent that the genus belongs elsewhere (Dawson, *pers. comm.*). Re-examination of the type and an additional specimen of *Allomicrodesmus dorotheae* from the Great Barrier Reef shows that the species has six branchiostegal rays characteristic of eleotrids; provisionally therefore we place *Allomicrodesmus* in the family Eleotridae. The undescribed genus and *Allomicrodesmus* are both monotypic and *Xenisthmus* contains about 10 species. Previously only a single species of *Calumia* was recognized. Examination of recently-collected material has indicated that a second undescribed species of *Calumia* exists. While examining types of gobioid fishes, it was discovered that *C. biocellata* is a senior synonym of *Eleotris godeffroyi* Günther (1877). Inaccuracies in the original description have prevented adequate identification of the species.

All of the marine eleotrid species are relatively small sized, ranging from 15 to 35 mm SL as adults. Few specimens have been collected and little is known of their distribution. For example, the species described here is known from only three specimens.

While most marine eleotrids are highly specialized forms, *Calumia* maintains a typical eleotrid physiognomy, with a broad scaled interorbital and a short robust body. The other genera are elongate with a protrusible lower jaw, presumably for burrowing in sand.

METHODS

Counts and measurements follow those given by Hubbs and Lagler (1958), except as listed below. The lateral scale count is the number of scale rows from the upper pectoral base to the end of the hypural plate. The transverse scale count (TRB) is taken from the anal base upward and backward to the base of the second dorsal fin. Colour notes of *C. godeffroyi* are based on freshly-collected specimens from the Great

Barrier Reef. Specimens studied are deposited in the following institutions: Australian Museum, Sydney, AMS; Bernice P. Bishop Museum, Honolulu, BPBM; British Museum (Natural History), London, BMNH; and J.L.B. Smith Institute of Ichthyology, Rhodes University, Grahamstown, RUSI. The osteology was studied from a single cleared and stained specimen of *C. godeffroyi*.

SYSTEMATIC DESCRIPTION

Calumia Smith 1958

Calumia Smith 1958: 148 (type species: *C. biocellata* Smith 1958, by original designation).

Calumia is readily distinguished from other eleotrids by the following combination of characters. Head depressed. Top of head, cheeks and opercles scaled; an enlarged scale between eyes. Anterior nostril elongate, positioned on snout just behind upper lip. Gill opening broad, extending forward to below preoperculum or eye. Pectoral rays unbranched. No lateral line head pores. Sensory papillae sparse, in characteristic rows (Fig. 3). Branchiostegal rays 6. First dorsal rays VI. Second dorsal rays I, 6-8. Anal rays I, 6-7. Segmented caudal rays typically 15. Lateral scale rows 21-25. Adults small sized, reaching 15 to 20 mm SL. Vertebrae 10 + 15. Caudal skeleton with two epurals. First dorsal pterygiophore inserted after third neural spine; second and third between fourth and fifth neural spines; fourth and fifth between fifth and sixth neural spines; sixth between sixth and seventh neural spine; pterygiophore from spine in second dorsal fin between seventh and eighth neural spine, without any interneural gap. Dorsal postcleithrum present.

In general appearance *Calumia* is most similar to *Ophiocara*. *Calumia* differs from that genus in lacking head pores, the arrangement of sensory papillae, the simple pectoral rays and the small size of adults.

KEY TO SPECIES

1. Mouth short, reaching to below anterior margin of eye. Gill opening extends forward to below posterior preopercular margin. Caudal fin with two enlarged black spots, one at upper caudal base and one on lower caudal base. Tongue tip pointed or slightly rounded. Pectoral rays 16-17. Gill rakers on outer face of lower part of first arch 6; short and stubby. Pelvic rays branched. Third and fourth dorsal spines longer than other spines *C. godeffroyi* (Günther)
2. Mouth longer, reaching to below posterior half of pupil. Gill opening broader, extending forward to below middle or posterior end of pupil. Caudal fin without enlarged black spots. Tongue tip bilobed. Pectoral rays 14-15. Elongate and pointed gill rakers on outer face of first arch 13-14. Pelvic rays unbranched. Second dorsal spine longest *C. profunda* n.sp.

Calumia godeffroyi (Günther)

Fig. 1

Eleotris godeffroyi Günther 1877: 188, p. 122, fig. B, (Raiatea, Tahiti).

Calumia biocellata Smith 1958: 148, p. II, K and fig. 8 (Zanzibar).

Counts of the holotype of *Eleotris godeffroyi* are indicated with an asterisk and counts of the holotype of *C. biocellata* are indicated with a plus. First dorsal rays VI (in 6)*+. Second dorsal rays I, 6(3)*+; I, 7(3). Anal rays I, 6(3)+; I, 7(3)*. Pectoral rays 16(2); 17(4)*+. Lateral scale count 21(1); 22(4)*+; 23(1). Transverse backward count 7(3); 8(2)+. Segmented caudal rays 15(6)*+. Lower gill rakers on outer face of first arch 6(4)+. Predorsal scales 7(4)*; 8(1); 9(1)+.

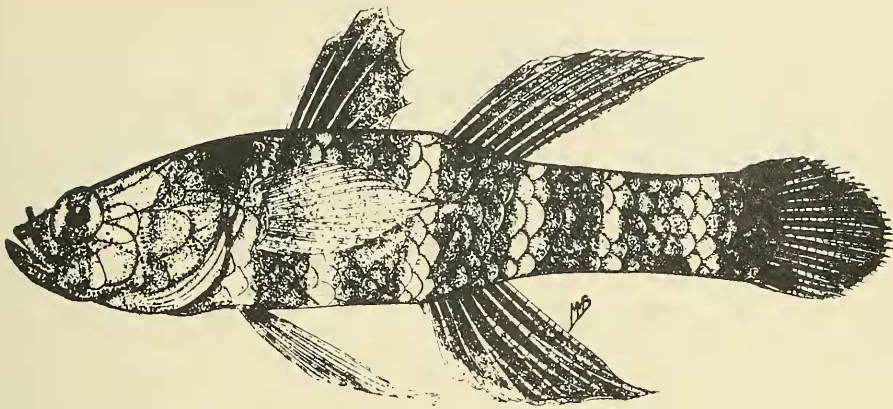


Fig. 1. *Calumia godeffroyi*; holotype of *C. biocellatus* (after Smith, 1958).

Smith (1958) has described the colouration of this species, under the name *Calumia biocellata*, in detail. Across the nape is a transverse dark band which begins above the end of the opercle and may be intensified as a distinct black blotch on either side of the nape. The body has five greyish black transverse bands, and a trace of a sixth incomplete band at the base of the caudal rays. At the base of each pelvic fin is a small black spot. The vertical fins are black. The two caudal spots are darkest at the caudal base and tend to fade posteriorly into the dusky anterior half of the caudal. In fresh material from the Great Barrier Reef the posterior third of the second dorsal and anal fins and the posterior half of the caudal fin are yellowish orange.

This species is distinctive in the features given in the key and has been adequately described by Smith (1958). Although the original description of *Eleotris godeffroyi* is brief, the species is well figured. Unfortunately, Günther (1877) did not mention or figure the two black caudal spots, but only indicated that the vertical fins are black. Examination of the holotype shows the spots and the five transverse body bands.

Calumia godeffroyi is a small-sized species, reaching a maximum size of 20 mm SL. The species is known from several localities in the western Indian Ocean (Smith, 1958), Christmas Island just south of Java (Allen, 1979) the Great Barrier Reef, Australia and Tahiti, and is undoubtedly widespread in the Indo-west Pacific. Smith (1958) reported collecting the species at low tide in muddy or weedy areas. On the outer islands of the Great Barrier Reef, the species was collected among coral and rubble at depths of 7 to 30 m.

Material Examined: BMNH 1877.4.26.8, a 20.5 mm female, holotype of *Eleotris godeffroyi*, Tahiti. RUSI 217, 1 (29), holotype of *Calumia biocellata*, Zanzibar. AMS I. 19472-086, 2 (14-19), Yonge Reef, Great Barrier Reef, Australia, 7-15 m. I. 19480-026, 2 (19-22), Yonge Reef, Great Barrier Reef, Australia, 20-30 m.

Calumia profunda sp. nov.

Figs 2, 3 and 4

Diagnosis: Mouth enlarged, reaching to below middle of eye or slightly beyond. Gill opening broad, extending forward to below middle to posterior end of pupil. Elongate rakers on outer face of first gill arch 13-14. Pectoral rays 14-15. Lateral scale count 24-25. Transverse scale count (TRB) 8. Second spine of first dorsal fin the longest and slightly prolonged. Seven dark brown transverse bands on body. Caudal fin without

enlarged black spots. Anterior tip of tongue bilobed. Pelvic rays unbranched. Outer row of jaw teeth not enlarged.

Description: Based on holotype and two paratypes. Counts of holotype indicated with an asterisk. Measurements of types given in Table 1. First dorsal rays VI (3)*. Second dorsal rays I, 6 (1); I, 7 (2)*. Anal rays I, 7 (3)*. Pectoral rays 14 (1), 15 (2)*. Lower rakers on outer face of first arch 13 (2)*, 14 (1). Segmented caudal rays 14 (1), 15 (2)*. Lateral scale count 24 (1), 25 (2)*. Transverse scale count (TRB) 8 (3)*. Predorsal scales 8 (3)*.

A small species maturing at about 15 to 18 mm SL. Body compressed posteriorly, more rounded anteriorly. Head large, 36 to 39% of SL, distinctly depressed. Eyes lateral, top of eye forming top of head profile, about 4 in head length. Jaws terminal, slightly oblique; end of jaws below posterior half of pupil or below midpupil. Tip of lower jaw protrudes slightly before tip of upper jaw. Anterior nostril an elongate tube about equal to pupil diameter, positioned just behind upper lip. Posterior nostril a raised rim midway between anterior nostril and front of eye. Snout about equal to eye, with slight protuberance on dorsal profile before eye.

Dorsal and anal fins short based, shorter than caudal peduncle length. First dorsal fin slightly elongate with a pointed distal margin, formed by the elongate second dorsal spine. Dorsal and anal rays elevated becoming progressively longer posteriorly, giving fins pointed posterior margins; tips of fins reach to base of caudal rays. Pectoral rays slender, unbranched, middle rays longest reaching to above anterior part of anal fin. Pelvic fins separate, composed of one spine and five unbranched rays; first segmented ray short, rays becoming progressively longer, with fourth ray extending to below middle to end of anal base; fifth segmented ray short, about equal in length to first ray. Caudal fin short, oval in shape, shorter than head length. Gill opening broad, with branchiostegal membranes attaching to middle of isthmus below middle of eye. Body scales ctenoid, but cycloid on head, breast, belly and pectoral base. Cheek and opercles covered with large scales. Scales on top of head extend forward to above the end of the eyes and a single enlarged scale between eyes. Both jaws with a band of irregularly spaced small curved pointed teeth, and an innermost row of larger, straight, backward-pointed teeth; bands of teeth extend full lengths of jaws, but become narrower posteriorly. No vomerine or palatine teeth. No

TABLE 1

Measurements of types of *Calumia profunda* and recently collected material of *C. godeffroyi* in millimetres

Measurement	<i>C. profunda</i>			<i>C. godeffroyi</i>	
	Holotype BPBM 21158	Paratype AMS I 17477-026	Paratype AMS I 20156-001	AMS I 19472-086	
Sex	♀	♀	♀	♂	♀
Standard length	18	16.5	17	14	19
Head length	7.0	6.0	6.7	4.9	6.8
Head depth at preopercular margin	3.8	3.0	3.3	3.0	2.6
Head width at preopercular margin	4.3	3.8	4.0	2.9	2.9
Upper jaw length	3.0	2.8	2.8	1.6	1.9
Eye length	1.8	1.6	1.6	1.5	1.7
Body depth at anal origin	4.0	3.4	3.5	3.6	4.5
Caudal length	—	4.8	4.8	3.8	—

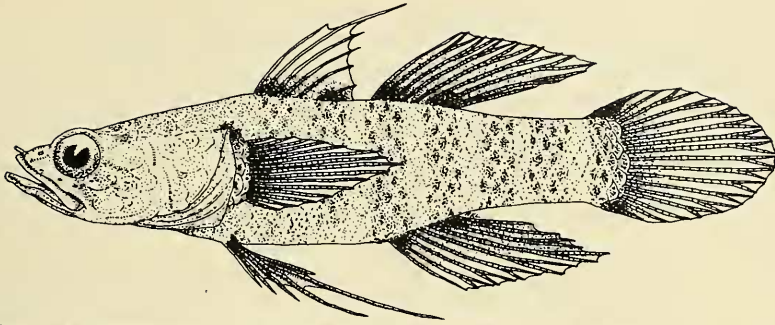


Fig. 2. Holotype of *C. profunda*. Drawing by H. K. Larson (caudal fin reconstructed).

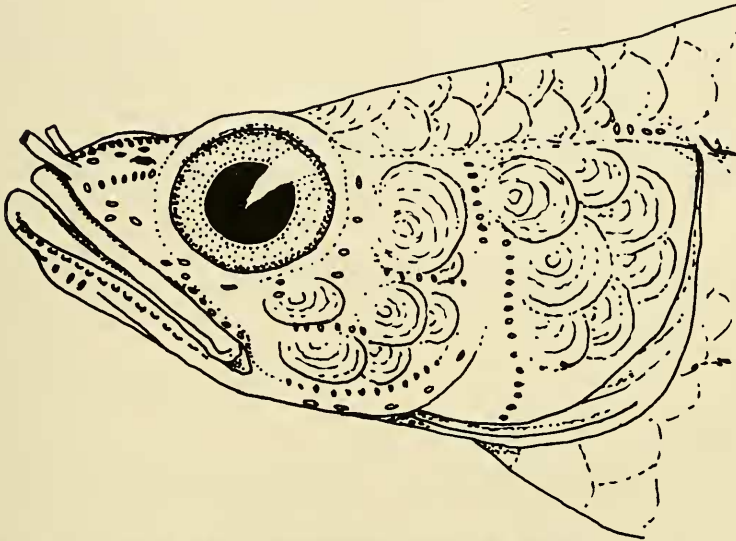


Fig. 3. Head of *C. profunda* showing arrangement of sensory papillae, side view.

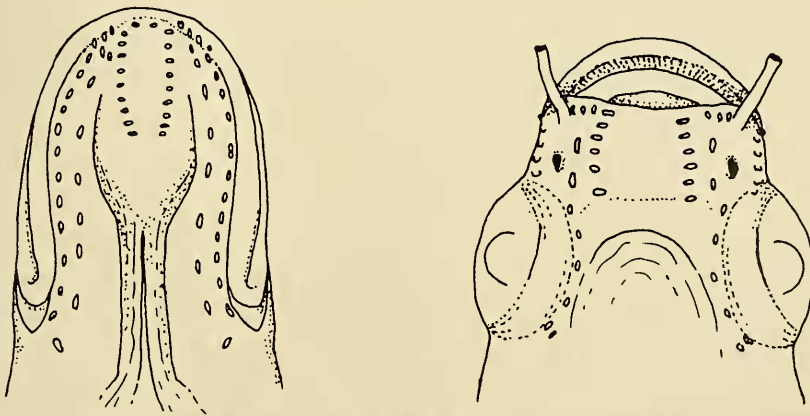


Fig. 4. Top (right) and ventral (left) views of head of *C. profunda* showing arrangement of sensory papillae.

open lateral line head pores. Sensory papillae sparse, obscured by scales on cheek, but distinct below eye, on top of snout and on lower surface of head (Figs 3, 4).

Colouration in alcohol: Head and body light brown. Centres of scales dark brown. Seven broad bands on body; first behind pectoral base; second under first dorsal fin; third and fourth under second dorsal fin; fifth and sixth on caudal peduncle; seventh at base of caudal. Head with faint brown bars radiating from eye ventrally and posteriorly. Snout, lips and underside of head dark brown. A dark brown blotch on each side of nape above upper end of operculum in front of pectoral base. Pectorals and pelvics with scattered melanophores. A dark brown spot at base of each pelvic fin. Caudal fin uniformly dusky, darker above and below base, where seventh body band extends onto fin. First dorsal fin with broad dark basal band, rest of fin clear. Second dorsal and anal fins dark brown basally, with body bands extending onto bases of fins; upper third of fins clear.

Colouration of freshly collected holotype: Head and body chocolate brown. Iris golden yellow. Nostrils white. Head with three orange stripes radiating posteriorly from eye. Posterior third of operculum and branchiostegal membranes orange. Scattered orange mottling on sides and top of head. Body bands chocolate brown, interspaces light brown anteriorly, white posteriorly. Scale centres orange in dark body bands only, forming distinct rows of small orange spots, about half of pupil diameter in size. Base of first dorsal bluish with scattered small brown and orange spots; middle of fin with a broad bright yellow stripe; tip of fin bluish. Second dorsal and anal as for first dorsal, except basal two thirds of fins with large orange spots and yellow stripe above middle of fins. Caudal yellowish above and below, middle of fin clear, with tiny white speckles; two or three small white spots along upper and lower margins near base of fin. Pectoral and pelvic fins clear to whitish. Base of pelvic fin with a black spot.

Etymology — from Latin, *profunda* — of the depths, alluding to its being found about relatively deep coral reefs.

Material Examined — Holotype: BPBM 21158, an 18mm female from 38 m depth Alite Reef, near Malaita, Solomon Islands; J. Randall and B. Goldman, 25 July 1973. Paratypes: AMS I.20156-001, a 17mm female, taken with holotype. I.17477-026, a 16.5mm female from 55m depth, Bogacio Island, Espiritu Santo, New Hebrides; G. Allen, W. Stark and D. Popper, 28 June 1973.

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